ASIA CLEAN ENERGY FORUM 2018
HARNESSING INNOVATION TO POWER THE FUTURE

Advanced Metering Infrastructure (AMI)

Different Situations, Different Requirements?

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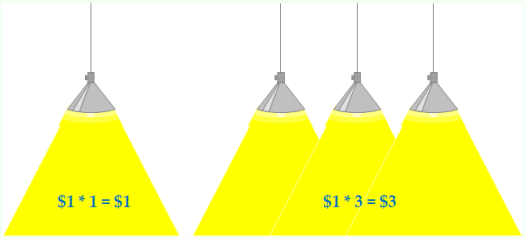
CONTENTS

History of Meter Reading

Evolution of Meter Reading: 0G ⇒ 1G ⇒ 2G ⇒ 3G

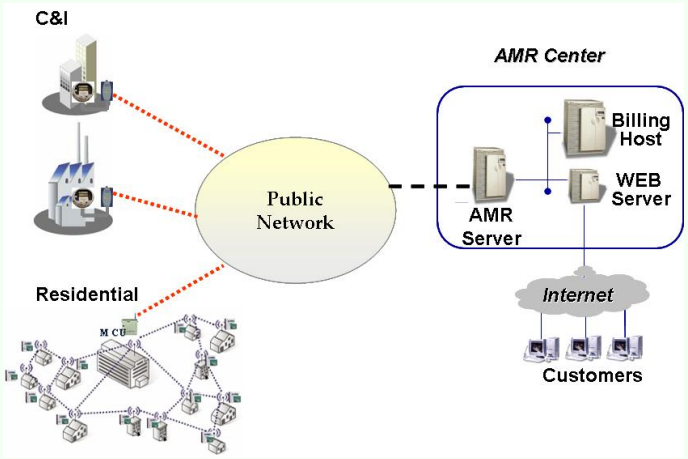


No metering (No meter reading)

Manual Reading

Off-site Meter Reading (OMR)

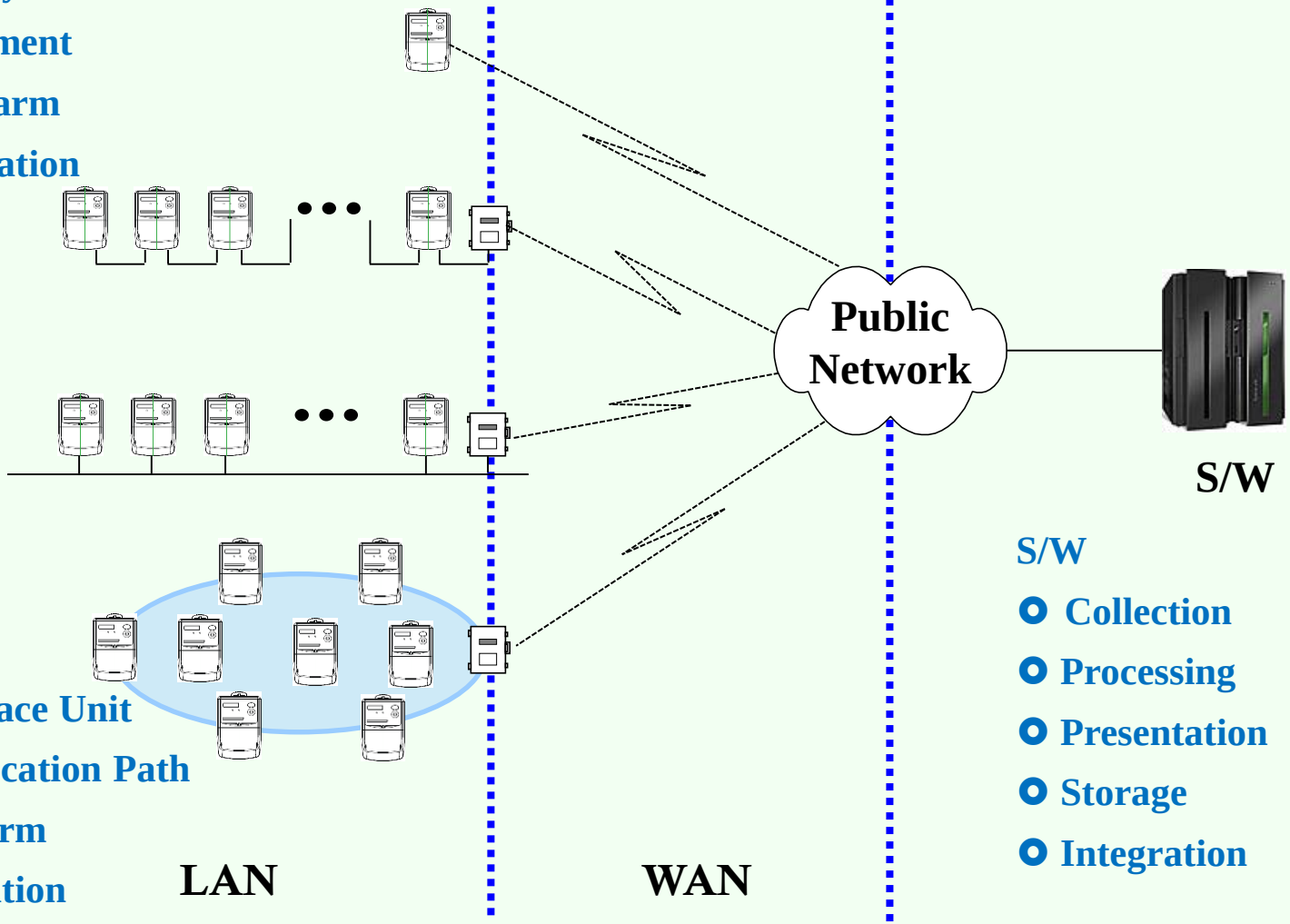
Automated Meter Reading (AMR)



Basic Components for AMR

Meter

- Metrology
- Measurement
- Event/Alarm
- Configuration



Meter Interface Unit

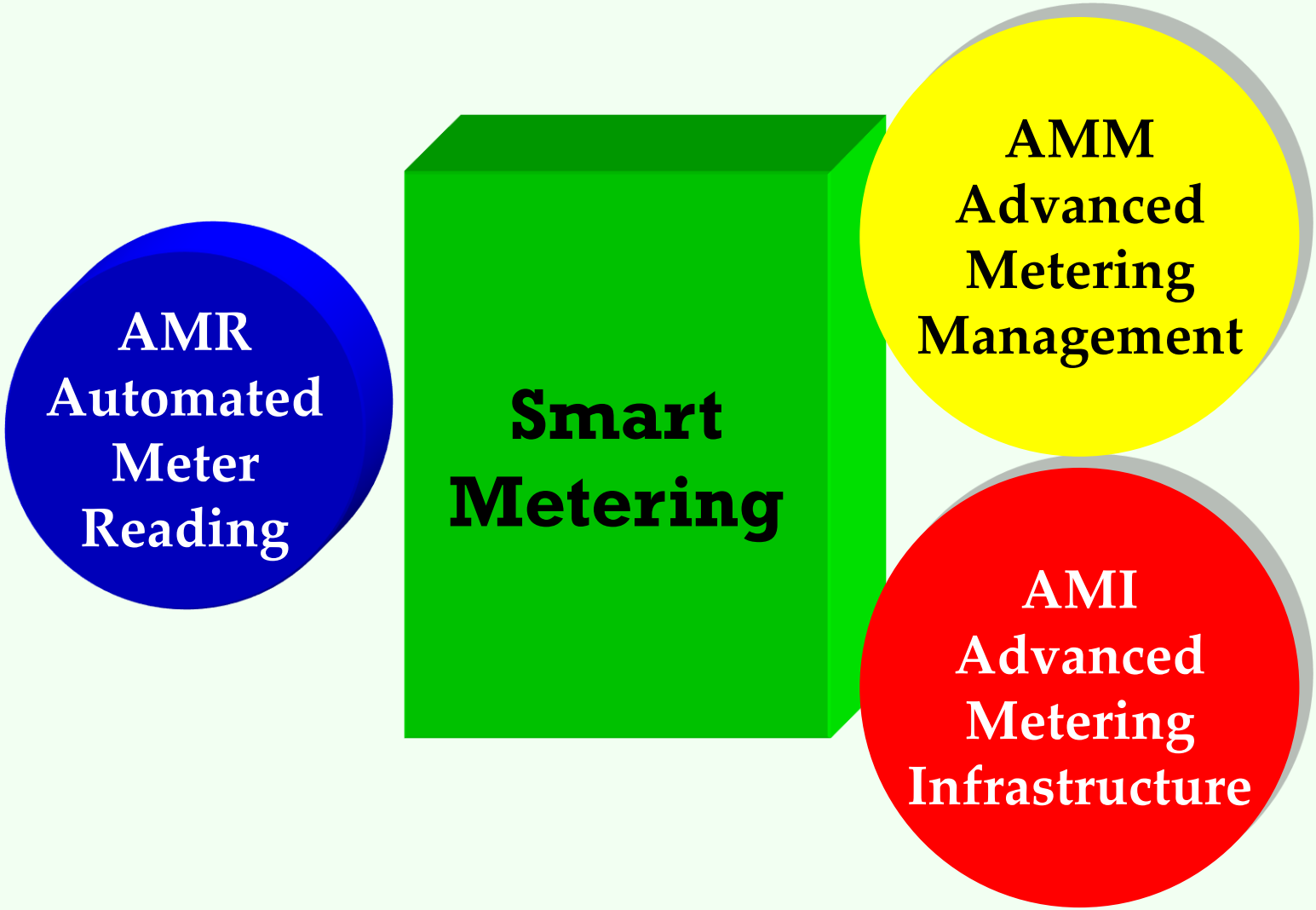
- Communication Path
- Event/Alarm
- Configuration

S/W

- Collection
- Processing
- Presentation
- Storage
- Integration

AMI

AMI, Eve's Diary?



Definitions of AMI

Federal Energy Regulatory Commission, USA

The full measurement and collection system.
Full measurement and collection system includes customer meters, communication networks and data management system.

Ministry of Energy, Ontario, Canada

It includes the meter, AMCD, LAN, AMRC, AMCC, WAN and related hardware, software and connectivity required for a fully functioning system that complies with this Specification. With some technologies, an AMI does not include AMRCs.
An AMI does not include the MDM/R.

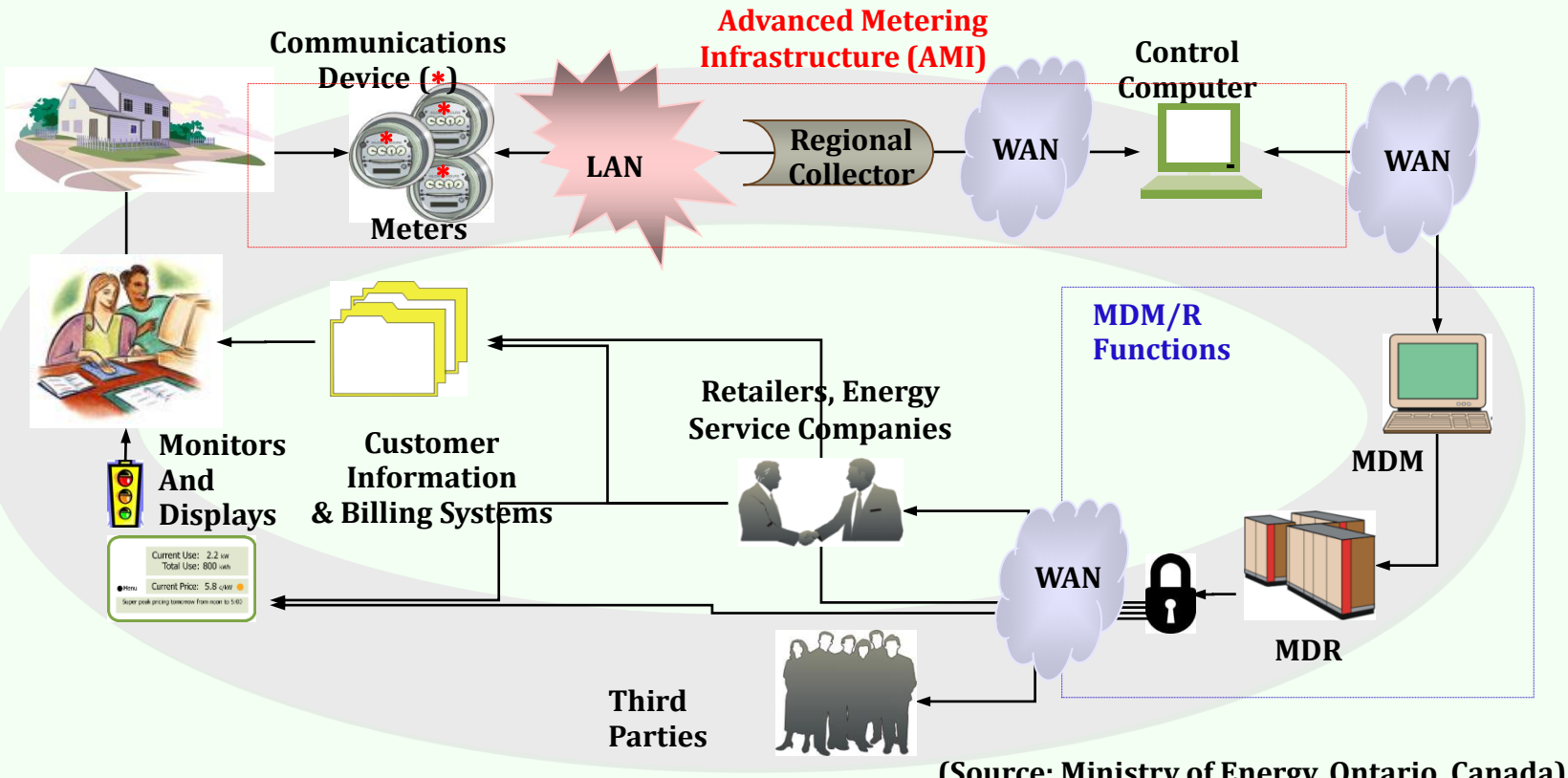
Department of Primary Industries, Victoria, Australia

AMI means the infrastructure associated with the installation and operation of electricity metering and communications including interval meters designed to transmit data to and receive data from a remote locality;

Advanced Metering Management, OFGEM, UK

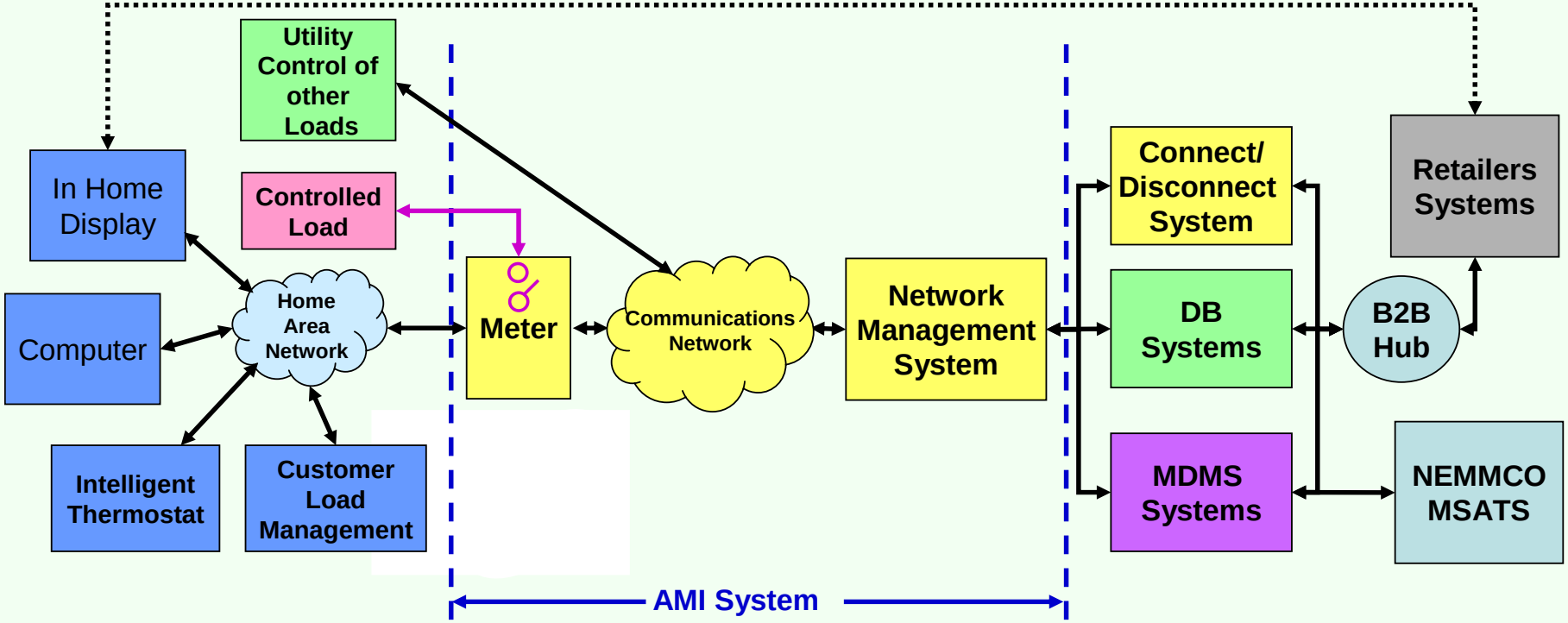
This describes metering arrangements that have two way communications between a meter and the data collector (electricity) or supplier (gas).

AMI Configuration - I



(Source: Ministry of Energy, Ontario, Canada)

AMI Configuration - II



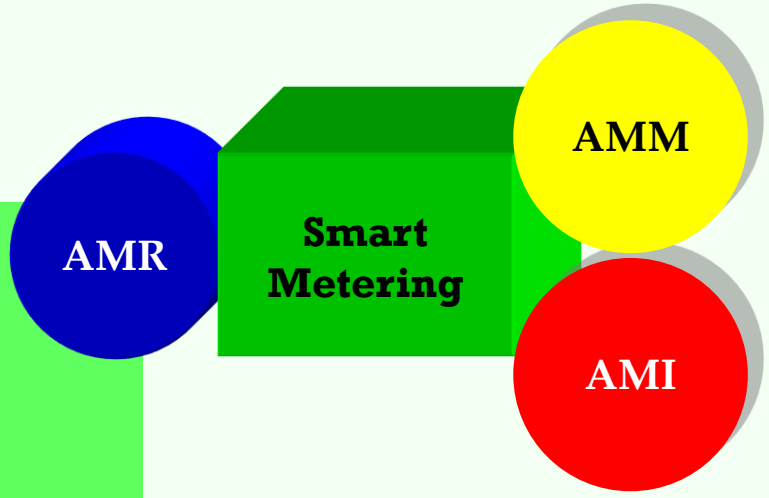
(Source: DPI, Victoria, Australia)

From AMR to AMI in Smart Grid

AMR → **AMI** → **AMI in SG** → **???**

- ❖ Remote/Automated meter reading
- ❖ Tamper detection

- ❖ 2-way communication
- ❖ Smart Meter
- ❖ Demand response
- ❖ Remote supply control
- ❖ HAN interface
- ❖ PQ monitoring



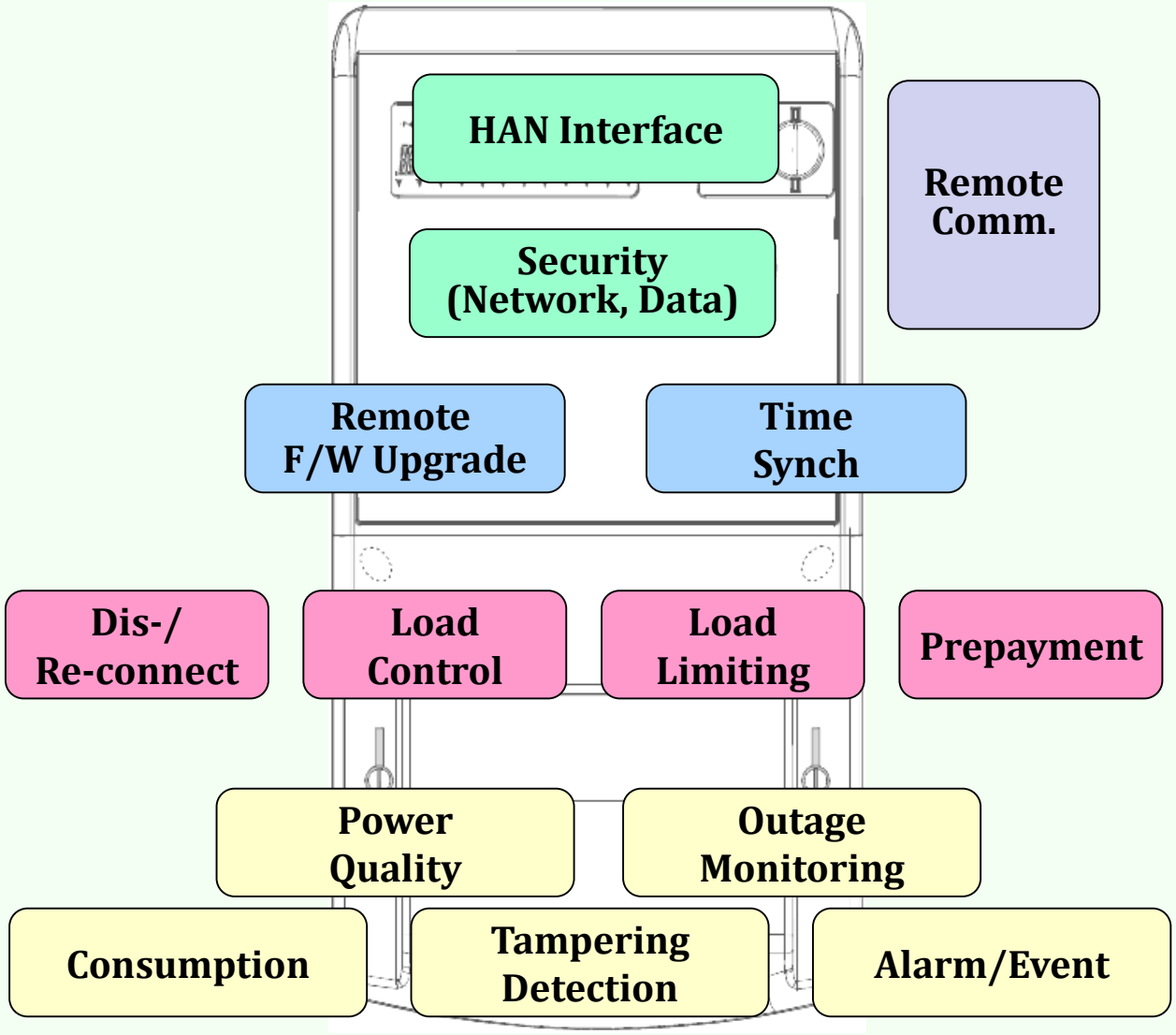
- ❖ Microgeneration monitoring (import/export)
- ❖ Energy storage management
- ❖ PHEV charging/discharging management

AMI
Functional Specification

National/Provincial Standard

- Ontario, Canada – Functional Specification for an AMI v2 (Jul. 07)
- Victoria, Australia – Minimum AMI Functionality Specification (Oct. 07)
- Netherlands – NTA 8130 (e) (Aug. 07), DSMR
- SINTEF, Norway – Requirement specification for full-scale development of Advanced Metering and Management Systems (AMS) (two-way communication) (Oct. 08)
- Eskom, South Africa – AMI for residential and commercial customers - NRS049 (08)

AMI Main Function



Functions for Whom?

Function	Utility	Customer	Remarks (C's view)
Consumption	☺	☺	Pay as you go!
Tampering detection	☺	☹	Energy thief?
Alarm/Event	☺	😐	
Power quality	☺	☺	
Outage monitoring	☺	☺	
Dis/Re-connect	☺	☹	
Load control	☺	😐	
Load limiting	☺	😐	Energy equality
Prepayment	☺	😐	Go as you pay!
Remote F/W Upgrade	☺		
Time sync	☺	☺	TOU, MD, RTP, CPP
Security	☺	☺	
HAN interface	😐	☺	
Remote communication	☺		

HAN Interface

Purpose: Mainly to provide energy information

HAN device: IHD, CIU, UIU

Standardization: Korea, Saudi Arabia, Netherland, UK, Norway, Sweden

Considerations

- **Who will pay for the HAN device? (ownership, maintenance …)**
- **Which information should be provided?**
- **At what interval?**
- **Are your customers ready?**

The Blue Marble

(Image source: NASA)

Think Green, Do Green to Live Green

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